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Neighbourhood environment and overweight and obesity prevalence among local residents: A review of literature

Okolica miejsca zamieszkania a występowanie nadwagi i otyłości wśród mieszkańców: przegląd piśmiennictwa

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ABSTRACT

The built environment, which refers to human-made or modified features of the physical neighbourhood, such as homes, schools, workplaces, or parks and recreational areas, undoubtedly has a great impact on our lifestyles and health behaviours.

The objective of this paper is a review of the literature on the correlations between neighbourhood environment and weight status of local residents. This paper presents factors in the built environment which may be related to overweight and obesity prevalence among local residents, resulting in changes in energy balance and affecting BMI. The focus is especially on the relationship between the distance from home to parks and green spaces and physical activity levels, and between the access to fast food restaurants and BMI status or obesity prevalence among residents. The results of recent studies are inconsistent, primarily because of several limitations and methodological problems, and due to multifactorial and complex relationships between the built environment and lifestyle. However, with the still unsolved problem of the increasing prevalence of overweight and obesity, even small changes in individual health behaviour may be important and have a positive impact on the reduction in BMI over time.

Therefore, all activities aimed at shaping neighbourhood environments in ways which facilitate healthy food choices and create opportunities for as well as encourage physical activity should be supported.

Key words: neighbourhood, health behaviours, BMI, obesity

STRESZCZENIE

Zurbanizowane środowisko, obejmujące stworzone lub przekształcone przez człowieka elementy środowiska fizycznego, takie jak dom, szkoła, miejsce pracy, czy parki i tereny rekreacyjne, bez wątpienia ma duży wpływ na styl życia i zachowania zdrowotne.

Celem pracy jest przegląd piśmiennictwa na temat zależności między środowiskiem miejsca zamieszkania a masą ciała okolicznych mieszkańców. Opisano potencjalny związek między występowaniem nadwagi i otyłości a elementami zabudowy lokalnego środowiska, które poprzez zmiany w bilansie energetycznym mogą wpływać na BMI mieszkańców. Uwzględniono w szczególności zależność między odległością parków i terenów zielonych od domu a poziomem aktywności fizycznej oraz dostępnością restauracji typu fast-food a masą ciała lub występowaniem otyłości wśród mieszkańców. Wyniki ostatnich badań nie są jednoznaczne, przede wszystkim z powodu szeregu problemów metodologicznych oraz wieloczynnikowych i złożonych zależności pomiędzy zabudową środowiska a stylem życia. Jednakże, ze względu na coraz częstsze występowanie nadwagi i otyłości, nawet niewielkie zmiany indywidualnych zachowań zdrowotnych mogą być ważne i pozytywnie wpływać na redukcję BMI z upływem czasu.

W związku z powyższym, należy wspierać wszystkie działania na rzecz kształtowania lokalnego środowiska, które ułatwiają dokonywanie zdrowych wyborów żywieniowych oraz stwarzają możliwości i zachęcają do podejmowania aktywności fizycznej.

Słowa kluczowe: środowisko sąsiedzkie, zachowania zdrowotne, BMI, otyłość

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INTRODUCTION

Neighbourhood environment may affect an individual's health both directly and indirectly. Several studies have linked the residential area with a wide range of health outcomes, such as diseases resulting from environmental exposure to pollutants, cardiovascular diseases, diabetes, obesity and lack of physical activity, and psychological anxiety, distress, and depression. Undoubtedly, the area of living has a great impact on an individual's lifestyle and well-being. Therefore, it is important to create a supportive neighbourhood environment which would promote physical activity and facilitate healthy choices.

The objective of this paper is a review of the literature on the correlations between neighbourhood environment and BMI and weight status of local residents. We aimed to find out what possible factors in the built environment influence the decisions concerning food choices or physical activity, which, through changes in energy balance, might affect BMI. The focus is on the physical characteristics of the residential environment, in particular on the proximity, density, and quality of parks and green spaces, and the types of restaurants and shops in the local area. To answer these questions, a comparative review of selected research studies published between 2007 and 2017 was conducted.

BMI IN URBAN AND RURAL AREAS

Epidemiological studies suggest that there are geographical and regional differences between weight status among residents. Presumably the discrepancy between rural and urban areas may be due to less favourable environmental conditions, fewer opportunities for physical activity, and socio-economic factors [1–3]. Also the gross domestic product of a country is indicated as one of the determinants of regional differences in health and weight status of residents in various countries [1].

According to the data presented in *Health Status of Population in Poland in 2014*, the incidence of elevated BMI among adults is more frequent in those living in rural than in urban areas [4]. A similar tendency in adult BMI status has been observed in Germany, Sweden, Finland, the United States and the western part of Canada [1, 2]. However, a study conducted in ten European countries has revealed no differences in the prevalence of overweight and obesity among adults aged 50–79 years between rural and urban areas, except in Greece [1].

Similarly, the findings among school-age children in Poland are not unanimous. Gurzkowska et al. report that the prevalence of overweight and obesity is higher in children from urban areas [5], whereas a study conducted by Wolnicka et al. demonstrates similar weight status of girls and boys living in villages, cities with <100,000 inahbitants, and cities with >100,000 residents [6]. Also among Polish adolescents aged 15–29 years, no significant difference in the prevalence of overweight or obesity has been revealed between those living in rural and urban regions [7]. In comparison, in Sweden, the rural-urban differences in BMI status among school children have been observed only in boys, with the increased risk for obesity in boys living in rural or semi-urban areas [8].

BUILT ENVIRONMENT AND PHYSICAL ACTIVITY OR OBESITY

In last decades, the growing incidence of obesity and overweight among both adults and children has become an alarming problem. Basically, obesity results from energy imbalance; therefore, all factors that promote high energy intake and low energy expenditure can be classified as obesogens. This category also includes the area of living, which has a great impact on individual behaviour and lifestyle. In particular, it concerns *the built environment*, which refers to human-made or modified features of the physical neighbourhood, such as homes, schools, workplaces, as well as parks and recreation areas, green spaces and transportation system, or streets and bicycle paths [9–11].

There is growing evidence that characteristics of the residential area, especially transportation, walkability, and access to parks, may influence an individual's physical activity and food choices, and therefore play a role in overweight and obesity development and related health consequences [9, 10,12].

METHODOLOGICAL PROBLEMS IN THE STUDY DESIGNS

The attempts to measure the relationship between the built environment and physical activity face several limitations and methodological problems. Firstly, in most studies, the focus is on subcomponents of physical activity, such as transportation and commuting, or recreational physical activity, but the impact of the built environment on the total physical

activity is rarely examined [13]. Secondly, the assessment of walkability or physical activity friendliness of the local neighbourhood is also a challenge, as not only such preferable objective measures as GIS (Geographic Information System) are used, but also perceived measures, including various self-reported questionnaires or residents' subjective perceptions of the local environment [14]. As a result, the distance from a resident's home to the nearest park or another destination point may be under- or overestimated if one takes into consideration only the subjective assessment of the distance or self-reported time of reaching this destination. Another problem is obtaining data about weight status. The majority of studies among adults rely on self-reported data, while the most objective method should be applied, that is, measuring height and weight to calculate BMI.

PARKS AND GREEN SPACES

Sedentary lifestyle and inadequate physical activity influence the weight status of individuals, especially adults. Therefore, park proximity and quality might be elements correlated with recreational physical activity and, as a result, affect BMI status. Some studies suggest that a park within walking distance from home or work can be positively associated with an individual's physical activity [15]. However, studies which used objective measures had fewer significant findings than studies based on perceived measures [15]. Although the distance is expected to be a factor influencing physical activity, the findings remain inconsistent. A possible explanation is that participants have limited knowledge of the parks within their neighbourhood and that the park of which they know might not be the one closest to their home [16]. Not only park proximity can affect one's behaviour; also the number and total area of parks within 1 km radius of an individual's home have been identified as significant predictors of physical activity that occurs in the neighbourhood and in parks [16]. Recreational physical activity in parks differs according to gender, age group, and retirement status. Living near a greater number of parks is more positively related with activity among women than men, and among younger (18 to 34 years) and older (above 55 years) adults [16]. Van Cauwenberg et al.'s findings have demonstrated that recreational physical activity in parks among adults aged 57–67 differs according to the retirement status. Non-retired individuals who reported living near a park were more likely to walk for recreation, and in this group, more minutes of recreational walking per week was positively correlated with higher park quality [17].

On the other hand, a study by Ali et al. has revealed no association between green spaces within walking distance and physical activity levels, which suggests that other factors can be more important in the use of green space and park than solely the distance, for example, their quality and attractiveness [18].

RESTAURANTS AND SHOPS

Local neighbourhood environment can affect one's dietary behaviour, especially fruit and vegetable or fast food intake. Undoubtedly, frequent consumption of energy-dense fast food affects body weight status and is a risk factor for overweight or obesity. However, the findings of several studies examining the associations between BMI or obesity prevalence among adults on the one hand and the access to fast food restaurants on the other remain inconsistent [19]. It seems that the impact of sole proximity and distance to fast food restaurants on body mass index may be overestimated. Therefore, an analysis of the associations between BMI and obesity and local area characteristics should also concentrate on the absolute density of fast food, full-service, and other types of restaurants and the total number of restaurants near residents' homes. The findings obtained by Polsky et al. suggest that if fast food restaurants are the predominant type of restaurant in the local area and are poorly balanced by other types of dining options, this situation is correlated with higher weight status among adults [20]. Similarly, Black et al. indicate that the risk of obesity is lower among adults living in neighbourhoods with higher densities of various types of stores and restaurants, and particularly full-service restaurants [21]. In contrast, Le et al.'s study among children aged 10–14 years suggests that neither the distance to the closest food outlet, nor the density of food outlets around children's homes is associated with odds for overweight or obesity [22]. However, the results also reveal that access to affordable healthy food options within walking distance from home (800 m) is connected with a lower risk of being overweight or obese among children [22]. In addition, Gibson's results indicate that low neighbourhood density of grocery stores is positively and significantly related to obesity and increased BMI [23]. This study also shows that moving from rural to urban area over a 2-year period results in a significant

change in BMI over that period, which is connected primarily with changes in neighbourhood supermarket density, small grocery store density, and full-service restaurant density [23]. A study by Williams et al. suggests a positive correlation between high density of fast food outlets in the neighbourhood and increased BMI z-scores among children [24]. Although the relationship between the built food environment and children's eating behaviours is complex and underexplored, in recent studies both distance to and density of food outlets (supermarkets and convenience stores) in the residential area appear to have a minor impact on children's dietary choices [25].

CONCLUSIONS

It is generally acknowledged that lifestyle is one of the most important factors affecting health. Nevertheless, triggering long-term changes in an individual's behaviour is very difficult. Therefore, possible solutions which might increase the chances for making healthier choices should be promoted. Creating an environment which supports and promotes health is one of the key elements of health promotion. This aim is still up-to-date, as most time of the day is typically spent at work or school, at home, or commuting. The impact of the built environment on body weight or BMI status of local residents remains underexplored, with the results of research studies focusing on that relationship being largely inconsistent. In addition, such a complex correlation is difficult to investigate due to several methodological problems. However, it seems that the impact of sole proximity and distance to parks and fast food restaurants on body mass index of local residents may be overestimated. It is suggested that the quality and attractiveness of green spaces may be related to the more frequent use of parks and park-based physical activity, which might affect BMI status and can be even more important than the sole proximity to the nearest park. Similarly, the potential impact of fast food restaurants in the neighbourhood on the increase in body weight is more probable if this is the predominant type of restaurant in the local area and poorly balanced by other types of dining options.

In view of these findings, it is desirable to shape cities and neighbourhoods in a way which would promote healthy diet and offer a variety of healthy food outlets and balanced dining options, as well as create attractive green spaces and parks offering opportunities for and encouraging recreational physical activity. This should be an integral part of obesity prevention programmes, because even small changes in individual behaviour may have a significant impact on weight status over time and positive long-term effects on health.

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